Sustainable FM

a new field of research and practice

Jensen, Per Anker; Nielsen, Susanne Balslev

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Per Anker Jensen and Susanne Balslev Nielsen
Centre for Facilities Management – Realdania Research
Technical University of Denmark

Introduction
Design managers have great impact on how sustainable a building will be during its operation period, and this article points to ways of integrating sustainable facilities management (SFM) in the design phase. So far sustainability of buildings has mostly been seen as the introduction of a new set of design criteria, which should be integrated in the technical optimization during the design process. At a new Danish research centre for Facilities Management we want to develop SFM as a new knowledge area, which provides holistic strategies for the development of sustainable facilities and user practices. For this purpose we study people, places and processes. More specifically we study organizations and their core businesses, the users of the facilities and the operational staff in their internal relations in order to understand the possibilities and challenges of implementing SFM. In this article we present our latest case studies which illustrate trends of SFM in Denmark.

Center for Facilities Management- Realdania Research
The Centre for Facilities Management – Realdania Research (CFM) was established from New Year 2008 at the Department for Management Engineering, Technical University of Denmark with financial support over a five year period from the private Danish foundation Realdania. The purpose is to strengthen research within Facilities Management, which at least in Denmark is a relatively new research area.

The research profile is in short defined as: *Research in space for humans, buildings with use value, and property and infrastructure that facilitates.* This indicates that the main focus of the centre is the interrelationships between physical environments and social activities and how professionally managed and serviced physical surroundings can support and improve the conditions and activities of humans and organizations.

Sustainable Facilities Management (SFM) is one of the focus areas of the research centre. The concept covers social, economical and environmental sustainability; however our competences are implementation of new and sustainable technologies and practices in the built environment. Our theoretical basis is Science of Technology Studies, planning and management theory, and organization theory. Whereas the results of our research will be new methodologies of integrating SFM in design management as well as in general FM-strategies, while documenting current practices and ways of increasing organizations learning and SFM-skills.

So far the literature on SFM is scarce, but the request for knowledge and skills to create sustainable buildings, to reduce operational costs and to contribute to climate plans is widely expressed by building owners, architects, engineers, planners and politicians. But what is SFM? One of the few books, ”Sustainable practices for the facilities managers” (Shah, 2007), is based on the understanding that SFM is to minimize the environmental load from facilities from a purely rational prioritizing of a number of known measures and that there is a general best practice for SFM. In our approach we do not accept that there is just one best practice for all situations. The best solution depends on the specific interrelationships between the use, the users, and the facilities and the context.

Trends of SFM in Denmark

The most rational strategy to reduce the energy consumption for heating and thereby also reduce the CO_2 outlet and the costs for heating probably is to downsize the building space and create space with multiple functionalities. However there are additional possibilities. In the following we present recent research of Danish and Swedish cases of SFM. The first case study shows a strategy for ensuring environmental consideration in every step of the design phase of a building project, the second demonstrates strategies to reduce energy use in existing buildings, while the third points to building administration as a mediator for SFM.

Think green while thinking big

A prominent example of a sustainable building is the new headquarters – DR City - for Danish Broadcasting Corporation (DR). Considerations for environmental sustainability have been in focus in the planning of the project right from the start, based on the corporation’s general environmental policy. DR City is also an environmental demonstration project, where special efforts are made to document the effects of the environmental aspects and to inform widely about the environmental work. This is part of the conditions for the financial support that the building project has received from EU as a so-called IT-ECO project. DR City is the first Danish building project with groundwater cooling and the building will have the largest building integrated solar panel installation so far in Denmark.

However, the effort to implement environmental considerations fully in the building design has been equally important as these environmental technology installations. In principle every choice of material and technical solution in the building design has been evaluated from an environmental perspective as an equal factor to functionality, esthetics and cost. A pleasant indoor climate, and next to that low energy consumption, has had the highest environmental priority in the design.

An important factor behind the high ambition level of the environmental work in relation to DR City has been a clear support from the top management in DR from the beginning of the project. It made it possible to clarify the environmental policy and requirements as well as the responsibilities and procedures before making agreements with the design teams. A measure like groundwater cooling has required comprehensive investigations and dialogues with authorities and an early start of this process has been necessary to have enough time to implement it as an integrated part of the building project.

The experiences also show that it is necessary with an ongoing effort from the client organisation to ensure that the environmental requirements are taken into consideration and to make the priorities between environmental considerations and other aspects. From an environmental point of view it can be relevant to specify rigid requirements but it can be necessary to re-evaluate, make compromises and relax the requirements during the design process. It is also necessary with ongoing follow-up and to check that all involved take the environmental considerations serious and do not give them low priority, because it is easier to do what they usually do or cheaper to use a product that does not comply with the environmental requirements.

Energy use and energy saving has to be managed

An interesting new concept in relation to energy reduction in buildings is the establishment of Energy Service Companies (ESCO), who offer to carry out investments in technical improvements of buildings' energy performance in their customers facilities without payment upfront but paid over time by part of the customers reduced energy costs. This can be in new buildings as well as existing buildings. The focus is often on replacing older technology with more modern and efficient technology. It can be advantageous for the customer to implement ESCO projects in close collaboration with the in-house FM organisation. This process would upgrade the internal staff and so optimize the building operation to ensure a long term effect. This was shown in a case study from a regional hospital organisation in Sweden.

Another case from Sweden shows that it is possible to achieve considerable energy savings without investments in new technology, but only by using highly competent professionals to optimize existing building installations. Dynamate AB is a subsidiary to the production company Scania – producer of lorries and busses. Dynamate provides production support to Scania and increasingly also to other Swedish production companies. One of their services is energy management and their experience is that they are able to do a lot within the energy field without making investments. At one of Scania's production facilities they achieved to fulfil a goal to reduce the costs for heating energy by half during 3 years. First and foremost this was done by trimming the systems.

However, Dynamate has also experienced that it is not necessarily the most cost demanding service which has the highest quality effect on the customer. For instance project management has a much larger quality effect on the customer than reflected in the cost share, whereas the opposite holds true for energy management. Although energy savings may have a large economical significance to the customer, the customer does not have the experience that it influences the production in terms of quality. On the other hand project management has a rather high quality effect as it directly implies improvements in the production. This emphasises that energy management and other environmental activities need to have a basis in top management and the overall policies and strategies of an organisation. Otherwise they may easily be neglected or given low priority by the lower levels of management.

Ownership and professional FM makes a difference

The incentives to implement environmental management are very dependent on the ownership of the facilities. We investigated this in a research project concerning housing estates in Denmark. The lack of incentives is particularly a problem in privately owned rented-out housing, because investments in improvements mostly have to be made by the owners, while savings on energy costs mostly benefits the tenants. Due to legislation the owners cannot in most cases increase the rent. The project shows that social housing organizations in general are most advanced in implementing environmental management. This has partly to do with the size of the organisation but also with a political conscience in the management of the organisation. However, the democracy among tenants can in some cases be a hindrance to environmental initiatives if it will increase the rent.

One of the most advanced Danish social housing associations in relation to sustainability has the experience that continuous focus on environmentally friendly building operation implies the choice of environmentally friendly technologies at renewal and refurbishments. There is a dissemination effect, so the green alternatives gradually become "normal" solutions. It is important that alternative solutions are not only "sold" solely on the considerations to environment and nature, but on other advantages as well, including the social life in the building. The cost aspect is always a crucial factor and the environmental considerations should be introduced in an economically sound way. Hence it is not about making environmental work redeemed to the few green environmental enthusiasts, but it should be a natural part of professional administration of a housing association.

Larger actors within the private housing estate sector also have the experience that environmental considerations over time are becoming a normal part of a professional building operation. The increased use of FM providers involved in large scale building operation on a wide number of estates compared to the directly employed caretakers on individual estates also results in an increasing professionalization. This implies that environmental considerations become the norm as an integrated part of practice.

Conclusions

The examples above from recent research show that SFM challenge the strategies of the design managers as well as the facilities managers. And since the period in which a building is in use is significant for the environmental impact of the building throughout its lifetime, SFM should be promoted in the building design. Experiences show that defined policies and strategies on SFM in the client organisation are necessary as well as leadership and active involvement by representatives from the client organisation in the briefing and the design process.

The present knowledge about SFM is limited and incoherent, and there is a need to establish more research-based knowledge in order to define relevant strategies for different types of organizations and facilities. At CFM our next step is to start a major new research project including a PhD study with the aim to develop a theoretical frame for understanding SFM and to identify which and how actors, conditions and drivers influence the development of FM from a sustainability perspective.

We are very interested in collaboration with interested parties and to get information on related work and interesting case studies from other countries.

References

- Jensen, Jesper Ole, Jensen, Per Anker, Elle, Morten, Hoffmann, Birgitte, Nielsen, Susanne Balslev and Quitzau, Maj-Britt (2008): Miljøstyret bygningsdrift i danske boligejendomme – under forskellige ejerformer (Environmental friendly building operation in Danish housing estates – under different forms of ownership). Danish Building Research Institute, Aalborg University.
- Jensen, Per Anker (2007): Space for the Digital Age – Defining, designing and evaluating a new world class media centre. BYG-DTU research report R-175.
- Jensen, Per Anker (2008): Facilities Management for Students and Practitioners. Centre for Facilities Management - Realdania Research, Technical University of Copenhagen.
- Jensen, Per Anker, Nielsen, Kjeld and Nielsen, Susanne Balslev (2008): Facilities Management Best Practice in the Nordic Countries – 36 cases. Centre for Facilities Management - Realdania Research, Technical University of Copenhagen.
- Shah, Sunil (2007): Sustainable Practice for the Facility Manager. Blackwell Publishing.

The authors

Per Anker Jensen (M.Sc., PhD, MBA, e-mail pje@byg.dtu.dk) and Susanne Balslev Nielsen (M.Sc., PhD, e-mail SBN@byg.dtu.dk) are associate professors at the Department for Management Engineering, Technical University of Denmark. Together they are responsible for managing the Centre for Facilities Management - Realdania Research (www.cfm.dtu.dk).